

- 1 1. A method of computing a drift reduction block for use in reducing drift in a
2 block of quantized MPEG discrete cosine transform coefficients, comprising:
3 processing a block of discrete cosine transform coefficients by dropping at
4 least one coefficient in the block;
5 forming a dropped coefficient block containing the at least one coefficient;
6 inverse quantizing the at least one coefficient to produce an inverse quantized
7 dropped coefficient block; and
8 inverse discrete cosine transforming the inverse quantized dropped
9 coefficient block to produce the drift reduction block.
- 10 2. The method according to claim 1, wherein the processing comprises
11 dropping at least one coefficient in the block containing high frequency coefficients.
- 12 3. The method according to claim 1, wherein the processing comprises
13 dropping a plurality of high frequency coefficients.
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1 4. A method of computing a drift reduction frame for use in reducing drift in a
2 frame comprising blocks of quantized MPEG discrete cosine transform coefficients,
3 comprising:

4 for each block in the frame:

5 processing a block of discrete cosine transform coefficients by
6 dropping at least one coefficient in the block;

7 forming a dropped coefficient block containing the at least one
8 coefficient;

9 inverse quantizing the at least one coefficient to produce an inverse
10 quantized dropped coefficient block; and

11 inverse discrete cosine transforming the inverse quantized dropped
12 coefficient block to produce the drift reduction block.

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14 5. The method according to claim 4, wherein the processing comprises
15 dropping at least one coefficient in the block containing high frequency coefficients.

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17 6. The method according to claim 4, wherein the processing comprises
18 dropping a plurality of high frequency coefficients.

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20 7. The method according to claim 4, further comprising mapping a block of
21 video coefficients to a corresponding block of coefficients in the drift reduction frame
22 using a motion vector.

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24 8. The method according to claim 7, further comprising discrete cosine
25 transforming the block of coefficients in the drift reduction frame.

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27 9. The method according to claim 8, further comprising quantizing the discrete
28 cosine transformed block of coefficients in the drift reduction frame.
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10. A method of reducing drift in a block of quantized MPEG discrete cosine transform coefficients, comprising:

computing a drift reference block of discrete cosine transform coefficients;
mapping the drift reference block to a block of quantized video coefficients, the block of quantized discrete cosine transformed video coefficients having at least one dropped coefficient using a motion vector; and

adding the coefficients of the drift reference block to the coefficients of the block of quantized video coefficients that have not been blocked to form a drift compensated block.

11. The method according to claim 10, further comprising variable length coding the drift compensated block.

12. The method according to claim 10, further comprising repeating the computing, mapping and adding for each motion vector in a frame of MPEG video.

13. The method according to claim 10, wherein the computing is carried out by:
forming a dropped coefficient block containing at least one coefficient dropped in quantizing the block of quantized MPEG discrete cosine transform coefficients;

inverse quantizing the at least one coefficient to produce an inverse quantized dropped coefficient block; and

inverse discrete cosine transforming the inverse quantized dropped coefficient block to produce the drift reduction block.

14. The method according to claim 13, further comprising discrete cosine transforming the block of coefficients in the drift reduction block.

15. The method according to claim 14, further comprising quantizing the discrete cosine transformed block of coefficients in the drift reduction frame.

1 16. An MPEG transcoder, comprising:
2 a variable length decoder (VLD) receiving an MPEG bitstream and produces
3 variable length decoded video frames and motion vectors that characterize
4 movement of objects in the video frames;
5 a processor that processes the frames of VLD decoded video by dropping
6 high frequency discrete cosine transform coefficients in blocks of data;
7 a drift reference frame creator that creates a drift reference frame by, for each
8 block in the video frame:
9 processing a block of discrete cosine transform coefficients by
10 deleting at least one coefficient in the block;
11 forming a dropped coefficient block containing the at least one
12 coefficient;
13 inverse quantizing the at least one coefficient to produce an inverse
14 quantized dropped coefficient block; and
15 inverse discrete cosine transforming the inverse quantized dropped
16 coefficient block to produce the drift reduction block;
17 a drift compensator that compensates for drift in video blocks in the frame by,
18 for each motion vector pointing to the frame:
19 using the motion vector, mapping a block in the drift reference frame
20 to a block of quantized discrete cosine transformed video coefficients having
21 at least one dropped coefficient;
22 discrete cosine transforming the block of coefficients in the drift
23 reduction block; and
24 adding the coefficients of the drift reference block to the coefficients
25 of the block of quantized video coefficients that have not been dropped to
26 form a drift compensated block; and
27 variable length coding the drift compensated block.
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1 17. A method of drift compensating a current frame of MPEG video, the current
2 frame having a motion vector associated therewith, comprising:
3 dropping pixels from a reference frame of video;
4 decoding the dropped pixels to form a drift reference frame;
5 mapping a block of video from the current frame to a block in the drift
6 reference frame; and
7 compensating the block of video from the current frame using the block in the
8 drift reference frame.
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10 18. The method according to claim 17, wherein the current frame of MPEG video
11 has a plurality of motion vectors, and wherein the mapping and compensating are
12 carried out for each of the motion vectors.
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14 19. The method according to claim 17, wherein the decoding comprises:
15 forming a dropped coefficient block containing the at least one coefficient;
16 inverse quantizing the at least one coefficient to produce an inverse quantized
17 dropped coefficient block; and
18 inverse discrete cosine transforming the inverse quantized dropped
19 coefficient block to produce the drift reduction block.
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21 20. The method according to claim 17, wherein the dropping comprises dropping
22 at least one coefficient in the block containing high frequency coefficients.
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24 21. The method according to claim 17, wherein the dropping comprises dropping
25 a plurality of high frequency coefficients.
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27 22. The method according to claim 17, wherein the compensating comprises
28 adding the block of video from the current frame to the block in the drift reference
29 frame.
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1 23. An MPEG transcoder having drift compensation that compensates a current
2 frame of MPEG video, the current frame having a motion vector associated
3 therewith, comprising:

4 means for dropping pixels from a reference frame of video;
5 a decoder for decoding the dropped pixels to form a drift reference frame;
6 mapping means for mapping a block of video from the current frame to a
7 block in the drift reference frame; and
8 a drift compensator that compensates the block of video from the current
9 frame using the block in the drift reference frame.

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11 24. The apparatus according to claim 23, wherein the current frame of MPEG
12 video has a plurality of motion vectors, and wherein the mapping means and drift
13 compensator map and compensate for each of the motion vectors.

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15 25. The apparatus according to claim 23, wherein the decoder decodes the
16 dropped pixels by:

17 forming a dropped coefficient block containing the at least one coefficient;
18 inverse quantizing the at least one coefficient to produce an inverse quantized
19 dropped coefficient block; and

20 inverse discrete cosine transforming the inverse quantized dropped
21 coefficient block to produce the drift reduction block.

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23 26. The apparatus according to claim 23, wherein the dropping comprises
24 dropping at least one coefficient in the block containing high frequency coefficients.

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26 27. The apparatus according to claim 23, wherein the means for dropping drops
27 a plurality of high frequency coefficients.
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1 28. The method according to claim 23, wherein the compensator compensates
2 by adding the block of video from the current frame to the block in the drift reference
3 frame.

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1 29. An MPEG transcoder having drift compensation, comprising:
2 means for forming a dropped coefficient block containing the at least one
3 coefficient;

4 an inverse quantizer that inverse quantizes the at least one coefficient to
5 produce an inverse quantized dropped coefficient block; and

6 an inverse discrete cosine transformer for inverse discrete cosine
7 transforming the inverse quantized dropped coefficient block to produce the drift
8 reduction block.
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10 30. The apparatus according to claim 29, wherein the forming means comprises
11 means for dropping at least one coefficient in the block containing high frequency
12 coefficients.
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14 31. The apparatus according to claim 29, wherein the forming means drops a
15 plurality of high frequency coefficients.
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1 32. An electronic storage medium storing instructions which, when executed on
2 a programmed processor, carry out a method of reducing drift in a block of
3 quantized MPEG discrete cosine transform coefficients, comprising:

4 computing a drift reference block of discrete cosine transform coefficients;
5 mapping the drift reference block to a block of quantized video coefficients,
6 the block of quantized discrete cosine transformed video coefficients having at least
7 one dropped coefficient using a motion vector; and

8 adding the coefficients of the drift reference block to the coefficients of the
9 block of quantized video coefficients that have not been blocked to form a drift
10 compensated block.

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